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EXAMINER

RAMADAN, RAMY O

ART UNIT	PAPER NUMBER
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2838

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/553,837

Applicant(s)

OKUNO, SHIGEO

Examiner

RAMY RAMADAN

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 10/20/2005.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claim 5 is objected to because of the following informalities:

The term "a reverse connection protection circuit" should read as --reverse voltage preventing circuit-- as disclosed in the specification and Fig. 2.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors. It is not clear whether the applicant is claiming an apparatus or a method. The claims contain phrases and terms with idiomatic errors, for example the phrase "--hereinafter referred to as lead sulfate (PbSO.sub.4)" (Claim 1, lines 7-8), is improper, the phrase "gradually, starting from a point where the crystals on the projecting crystal surfaces are spaced apart from each other by the smallest distance between the positive and negative electrodes" (Claim 1, lines 9-12) is indefinite and the limitation "a low electric power consumed

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using the lead-acid battery as a power source" is indefinite and not clear (Claim 4, lines 3-4).

Claim 1 recites the limitation "the projecting crystal surfaces" in line 10. There is insufficient antecedent basis for this limitation in the claim.

In addition, the limitation "followed by charging the battery to thereby dissociate the pulverized lead sulfate (PbSO_4) crystals into Pb^{+} and SO_4^{2-} in the dilute sulfuric acid, which return to the respective electrodes to thereby recondition the lead-acid battery" is indefinite and it fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention, since the limitation teaches dissociating the pulverized lead sulfate (PbSO_4) crystals into two components Pb^{+} and SO_4^{2-} , wherein the two components returns to the respective electrodes, while it is not clear what the applicant means by the term " SO_4^{2-} " and how " SO_4^{2-} " is returned to a respective electrode, since applicant's disclosure states that by charging, lead sulfate is converted in to sulfuric acid (H_2SO_4), lead (Pb), lead dioxide (PbO_2), and water (H_2O), to thereby recondition the lead-acid battery to its as-manufactured condition (Page 4, Para [0008]). The reaction as stated in applicant's disclosure is a typical reverse reaction caused by charging which results in to returning lead (Pb), lead dioxide (PbO_2) to the respective positive and negative electrodes of the battery, therefore it is not clear what the applicant means by the limitation as disclosed in claim 1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims are rejected under 35 U.S.C. 102(b) as being anticipated by Eryou et al. (US 5,648,714), hereinafter Eryou.**

As per claim 1, Eryou discloses a method and device for charging and conditioning batteries comprising:

applying current pulses (spike-shaped voltage pulses) with peak voltage (V_p) across a first and second connectors (electrodes) of a battery using a constant voltage (V_0) ($E(v)$) as a reference (Col. 3, lines 4-17) Col. 5, lines 37-49), wherein the current pulses point in a negative direction from the constant voltage (V_0) (Fig. 4), wherein the current pulses reduce the crystallization (pulverize) of the lead sulfate on the battery electrodes (Col. 2, lines 38-49 and Col. 7, lines 1-15);

a charging process for the battery to convert (dissociate) the crystallized lead sulfate to lead and lead dioxide which return to the electrodes to restore the active materials of the battery and therefore recondition the battery (Col. 1, lines 30-35 AND Col. 2, lines 38-51).

As per claim 2, Eryou discloses that the pulses have a time period of 10 micro seconds or less (covering the range of 1 micro second or less) to reduce the crystallization of the lead sulfate on the battery electrodes (Col. 9, lines 45-51).

As per claim 4, Eryou teaches that the lead acid battery could be discharged at different states (Col. 2, lines 64-67).

5. Claims 1-2 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Gali (US 5,063,341).

As per claims 1 and 4, Gali discloses a lead acid battery rejuvenator and charger comprising:

a pulse signal generating circuit for supplying fast rise voltage pulses (spike-shaped voltage pulses) between the positive and negative terminals (electrodes) of the battery using a theoretical battery voltage (positive voltage E (v)) as a reference (Abstract, Col. 1, lines 43-65, Col. 4, lines 49-69 and Col. 5, lines 5-29), to thereby releasing (pulverize) the distributed lead sulfate over the entire plate (electrode) back in to the sulfuric acid solution (Col. 1, lines 24-30). Gali teaches that the battery is being charged by the charger circuit, wherein the device is capable of charging the battery to dislodge (dissociate) the deposits of lead sulfate released from the battery plates (Abstract and Col. 1, lines 37-40), which would implicitly dislodge in to lead and lead dioxide, which would return to the respective battery plates.

As per claim 2, Gali teaches that the fast rise voltage pulses, which inherently generate current, have a time width (duration) of 5 micro seconds or less (covering the range of 1 micro seconds or less) to release the lead sulfate over the entire plate

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(electrode) either going back in to the sulfuric acid solution or broken up (Abstract and Col. 1, lines 53-57).

As per claim 3, Gali teaches that the fast rise voltage pulses occur in approximately 2 KHz to 10 KHz per second frequency range (with in the range of 1 KHz to 100 KHz) (Abstract and Col. 1, lines 55-58).

6. Claims 1 and 4 are rejected under 35 U.S.C. 102(a) as being anticipated by Okuno et al. (JP 2003163001), hereinafter Okuno.

Okuno discloses an apparatus for removing non-conductive crystal film (PbSO₄) adhered to electrode of lead battery by applying a negative pulse (spike-shaped voltage pulses pointing in a negative direction) to the electrode, one by one, to break and destroy (pulverize) the surface of the largely grown non-conductive crystal film (PbSO₄), while any positive voltage could be used as a reference since the pulse is in the negative direction. Okuno further discloses that charging is followed to return (dissociate) the non-conductive crystal film (PbSO₄) to sulfuric acid (H₂SO₄) and lead (Pb), which return to the surface of the electrode to thereby return the surface of the electrode to an initial state of a manufacture (recondition the lead-acid battery) (Abstract, Page 1, Para [0004]-[0005] and Page 2, Para [0006]-[0007]).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eryou, in view of Gali.

As per claim 3, Eryou does not explicitly disclose that the frequency of the current pulses is adjusted in range of 1 KHz to 100 KHz. However, Gali teaches that the fast rise voltage pulses occur in approximately 2 KHz to 10 KHz per second frequency range (with in the range of 1 KHz to 100 KHz) (Abstract and Col. 1, lines 55-58).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to adjust the frequency of the current pulses in Eryou to be in the range of 2 KHz to 10 KHz as disclosed by Gali to cause battery plate saturation that is 1:1 to 1:3 times the theoretical battery cell voltage to release lead sulfate deposits (Col. 1, lines 43-66), and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As per claim 5, Eryou discloses and shows in Figs. 1 and 9, a diode (D6) a (reverse connection protection circuit); a battery sensing system (4) (a voltage detection circuit); a microprocessor control unit (5) (a reference-voltage generating circuit); a voltage comparator circuit; a transistor switch (17) (operation/non-operation switching circuit); an oscillator (15) (oscillating circuit and spike-shaped voltage pulse generating circuit); and a buffer (15) (an amplifier circuit and a wave shaping circuit); (Col. 4, lines 50-67, Col. 5, lines 1-9 and lines 16-19, Col. 7, lines 42-67 and Col. 8, lines 1-8).

Eryou does not explicitly disclose an operation indicator which is operated only by pressing an operation check switch.

However, Gali discloses and shows in Fig. 4, light emitting diodes (L1-L10) (operation indicator) for indicating which battery rejuvenation circuit connection is activated, a reset button (214) and a test button (215) (operation check switch) (Col. 6, lines 13-29).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the device as disclosed by Eryou to include light emitting diodes, a reset button and a test button as disclosed by Gali to provide an optimum charger and battery conditioner and to provide convenience to the user by indicating and displaying the operation taking place by the device.

9. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okuno, in view of Gali.

As per claim 2, Okuno does not explicitly disclose that the duration of the pulses is 1 micro seconds or less. However, Gali teaches that the fast rise voltage pulses, which inherently generate current, have a time width (duration) of 5 micro seconds or less (covering the range of 1 micro seconds or less) to release the lead sulfate over the entire plate (electrode) either going back in to the sulfuric acid solution or broken up (Abstract and Col. 1, lines 53-57).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to adjust the frequency of the negative pulses in Okuno to have a duration of 5 micro seconds or less as disclosed by Gali, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering

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the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As per claim 3, Okuno does not explicitly disclose that the frequency of the current pulses is adjusted in range of 1 KHz to 100 KHz. However, Gali teaches that the fast rise voltage pulses occur in approximately 2 KHz to 10 KHz per second frequency range (with in the range of 1 KHz to 100 KHz) (Abstract and Col. 1, lines 55-58).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to adjust the frequency of the negative pulses in Okuno to be in the range of 2 KHz to 10 KHz as disclosed by Gali, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okuno, in view of Gali, further in view of Eryou.

As per claim 5, Okuno discloses a voltage detector, a threshold voltage generator, a voltage comparator, an operating/non-operating switching unit, a negative pulse generator (spike shaped voltage pulse generating circuit), and an amplifier (Abstract).

Okuno does not explicitly disclose an operation indicator which is operated only by pressing an operation check switch.

However, Gali discloses and shows in Fig. 4, light emitting diodes (L1-L10) (operation indicator) for indicating which battery rejuvenation circuit connection is

activated, a reset button (214) and a test button (215) (operation check switch) (Col. 6, lines 13-29).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the device as disclosed by Okuno to include light emitting diodes, a reset button and a test button as disclosed by Gali to provide an optimum charger and battery conditioner and to provide convenience to the user by indicating and displaying the operation taking place by the device.

Okuno when modified by Gali does not explicitly disclose a reverse connection protection circuit, an oscillating circuit and a wave shaping circuit.

However, Eryou discloses and shows in Figs. 1 and 9, a diode (D6) a (reverse connection protection circuit) and an oscillator (15) (oscillating circuit and spike-shaped voltage pulse generating circuit) (Col. 4, lines 50-67, Col. 5, lines 1-9 and lines 16-19, Col. 7, lines 42-67 and Col. 8, lines 1-8).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the device as disclosed by Okuno when modified by Gali to include a diode and an oscillator to limit current to avoid battery damage and to generate a pulse at a predetermined frequency, width and shape to effectively remove the sulfate deposits on the electrodes of the battery (Col. 4, lines 50-67 and Col. 5, lines 1-9).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAMY RAMADAN whose telephone number is (571) 272-9761. The examiner can normally be reached on Mon-Fri 7:30 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on (571) 272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ramy Ramadan
Examiner
Art Unit 2838

RR
2/1/2008

/Gary L. Laxton/
Primary Examiner
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